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ABSTRACT

This collection of lessons is designed to be presented to sixth-grade students in a sequence of 10 class days. Using reading and language skills, the lessons are intended to help students become interested in the energy future and to develop personal values. Special attention is given to conservation and development of alternative energy sources. Also provided are supplementary activities and a list of sources of free or inexpensive materials. (Author/RE)

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ENERGY FOR THE FUTURE

by Mildred McReynolds

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"Energy For the Future"

RATIONALE:

The topic was chosen because of the seriousness of the energy problem and of the stake that young people have in the future of the world. America is running out of readily available, readily usable energy. Energy is our key to tomorrow. Young Americans need to be aware of the situation. Each student needs to consider how his or her lifestyle will be affected, how he or she can help to save dwindling supplies, and what his responsibility is for the future.

SUGGESTED SUBJECT AREA:

This unit will be used in conjunction with language arts and reading at the sixth grade level. There can be wide reading and many appropriate activities involving the language experience approach. This approach will help students who are average or above-average achievers become involved, interested, and will develop personal values in the area. This unit gives special emphasis to two aspects---conservation and development of alternative energy sources.

GOAL:

The goal is to make sixth grade students aware of the seriousness of the energy problem and to help them to realize that each person can make a contribution to the world of the future by saving energy in many forms and by setting an example of conservation for others.

OBJECTIVES:

From wide reading and discussion, the student will develop an awareness and a concern for the seriousness of the nation's and the world's fuel and energy crisis. He or she will read, research, and form his or her own conclusions about his responsibility for conservation. He will become more knowledgeable concerning energy alternatives.

The student will provide a variety of writing samples which will reveal his personal feelings concerning his responsibility and his role in his nation's future.

INTRODUCTORY CONTENT:

Between 1978 and the year 2000, the United States will consume more energy than it has in its entire history. By 2000, the worldwide annual demand will triple.

As energy needs become more acute, options which are developed must be practical, economical, environmentally acceptable, and socially acceptable.

The United States uses one-third of the energy and has only 6 percent of the world's population. She relies heavily on the fossil fuels---coal, oil, and natural gas---for her energy needs. These are rapidly being depleted, and new supplies are not forming in appreciable amounts. Each year America imports more oil and natural gas than in past years. This places her in a vulnerable position, world-wide.

In 1973 America imported 35 percent of her petroleum. In 1977 she imported 50 percent. There are still large supplies of coal, but they furnish only 18 percent of America's energy. Hydroelectric power is limited by the lack of suitable sites, but within ten years, it will be meeting up to 10 percent of the demand.

Below is a discussion of possible sources for the future.

-- Petroleum - All known reserves will be gone in the twenty-first century. There are some undiscovered reserves, however. In 1975, oil produced 47 percent of United States energy. There must be a shift to other sources of energy to reserve oil for its most essential uses---lubricants, plastics, and fuel for mobile transportation.

-- Natural Gas - Proven reserves will last only 10 to 12 years. America faces an immediate natural gas shortage of great proportions, rising imports, and ever-growing dependency on foreign sources. This dangerous trend toward loss of energy self-sufficiency is evident. In 1970, the United States imported 22 percent of her oil and 4 percent of her gas. It has been projected that by 1985 the United States will be importing 60 percent of her oil and 28 percent of her gas. On a total energy basis (fossil fuels, nuclear, and hydroelectric), by 1985, this will deteriorate to drastically reduced percentages.

-- Shale Oil - This is sedimentary rock from which oil is derived. In the United States, it exists in the North and Midwest. It is very costly compared to conventional petroleum. There are three factors to keep in mind: (1) most shales hold about 24 gallons or less of potential oil per ton of shale; (2) although the hydrocarbon content of all shale is estimated at 1000 trillion barrels, only one part in 10,000 is recoverable, and (3) oil from shale may add only another 10 percent to man's oil reserves.

-- Coal - This is the giant of the fossil fuels. However, it inflicts a terrible penalty upon men who wrest it from the earth. Deep coal mining is dangerous to life, hazardous to health, and expensive. Strip-mining appears to be the only hope to buy time to phase into nuclear energy, and it utterly ravages the land so that it is years before the land will again yield vegetation.

-- Wind - The area of largest potential is the Great Plains. The ideal wind machine has not yet been invented. Two percent of the solar radiation that falls on the earth is converted to wind energy. Wind energy is usable on an average of only two days a week. The energy storage problem must be solved. What can be done when the wind stops blowing? Also, the steady winds blow high in the atmosphere so that towering windmills would be needed---about one to ten miles high, or between five to fifty stacked Empire State buildings.

-- Geothermal - This is energy extracted from the earth's natural heat. Although the potential is great, only a small portion of this is acceptable. This fraction, if fully developed, would generate about 1 percent of present total energy needs. Some geothermal energy is in use in California.

-- MHD - The letters stand for magnetohydrodynamics, a process of converting hot gases into electricity by passing them through super-conducting magnets, which operate on the same principle as electrical generators. MHD units are 40 percent efficient and have potential of 60 percent efficiency. Practical use of MHD faces many development hurdles, such as construction of the required gigantic super-conducting magnets and extension of the practical life span of generators, which operate at extremely high temperatures.

-- Nuclear - The atomic energy program is a classic example of too little and too late. The year 2020 will arrive before nuclear energy will be capable of supplying the nation with all its electrical needs. Nuclear energy was recognized in the forties as the power of the future. It has been so thwarted by those people concerned with its environmental consequences that it has moved at a snail's pace and cannot deliver significant amounts of energy before the turn of the century. In 1976, nuclear reactors produced 9 percent of the country's electricity. Possibly by 1990, they will produce 35-40 percent of the power. The potential output is quite large. For example, a pound of enriched uranium 235 is about the size of a golf ball, yet it has the same energy potential as 3,000,000 pounds of coal.

-- Bioconversion -

I. From plants - Biomass, plant material in any form from algae to wood. This has an energy content about half that of the better coals. It has been estimated that an energy farm the size of Texas could fuel all the needs of the U. S. by 1985. A ton of dry biomass can be processed to yield 1.25 barrels of oil, 1200 cubic feet of medium BTU gas, and 750 pounds of a solid residue that is roughly equivalent to coal in heat value.

Algae and water hyacinths produce large biomass and have high solar conversion efficiency. An acre of corn

will produce six tons of organic material. The eucalyptus yields 8 to 25 tons per acre. There is significant interest in using trees for fuel.

Trees could convert sunlight to wood at 3 percent efficiency, and wood could be burned at 40 percent efficiency. On a tree farm, trees could be harvested every ten years and burned in a power plant, at the center of the tree farm, thereby minimizing transportation costs.

II. From wastes - This country is increasingly aware of "trash power." In 1973, the U. S. disposed of 135 million tons of solid waste---3.5 pounds per person per day. Disposal of waste costs $3.5 billion, and this bill is increasing as landfill and ocean disposal sites disappear.

Municipal solid waste is 80 percent combustible. The energy potential of these 135 million tons is equivalent to 150 million barrels of oil per year. In addition to municipal wastes, America produces even greater amounts of agricultural and lumbering residues which are also combustible.

The organic wastes are of primary interest from an energy point of view, because they are composed of once-living material and their molecules contain energy which can be released. Organic wastes represent an important fuel source for the future. The total potential resource is large. If all the 1971 waste had been converted to energy, it would have supplied 13 percent of the total energy demand and 44 percent of the electrical demands. Conversion plants will need pollution control devices, but generally their contribution to pollution will be lower than plants using fossil fuels.

No single alternative source will supply all energy needs. During the next 10 to 20 years, the United States will have to depend on alternative sources and conservation of existing sources.

INSTRUCTIONAL PLAN

DAY 1

"Energy For the Future"

Activities:

1. The teacher will ask each student to write what the word "conservation" means to him or her. Later, students will react to these definitions in large-group discussion.

2. The students react to "My Town's Energy Concerns." The teacher asks:

   a. How is your home heated?
   b. Where does the electricity that serves your home come from?
   c. How does the power plant generate electricity?

   The students search the newspaper for energy-related articles:

   a. How did the newspaper handle energy-related problems?
   b. What sources of energy do you know of?
   c. Where does our town get its fuel supply?
   d. What energy-related problems has our town experienced?
   e. Could these have been avoided?

3. The teacher will ask students to observe how many ways energy is used from the time they get up in the morning until they enter school. They will be asked to list these and discuss them on the following day.

4. The students, in a large group discussion, will plan an Energy Awareness Day. This will be held on the fifth day.

Materials needed - Paper and pencils

DAY 2

Activities:

1. The students will fill out and discuss the form on "Value Judgments" included in the unit.

2. They will be given the following vocabulary: atom, British Thermal Unit (BTU), horsepower, kilowatt, biomass, and breeder reactor. These terms are included in the teacher material.

3. They will discuss in the large group the results of each student's tally of the ways he or she used energy that morning from waking up to arriving at school.

4. The students will be asked to keep a list of unnecessary trips in the family car.

Materials needed - Paper and pencil; exercise on value judgments

Value Judgment

This exercise is designed to give you some insight into your own values. There are no right or wrong answers.

Which do you consider to be the most important? Scale:

1 = most
15 = least

_____Pure water

_____Clean air

_____Reduction in noise levels

_____An understanding of ecology

_____Conservation of our natural resources

_____Developing an environmental lifestyle

_____Elimination of litter

_____Stabilized population growth

_____Refrain from using biocides (pesticides)

_____Wise consumer practices

_____Diminish our energy consumption (electricity)

_____Rational land usage

_____Lessen private and commercial solid waste production

_____Control thermal pollution

_____A sensitivity to one's surroundings (environmental awareness)

Vocabulary

Atom - The basic building block of all matter.

British Thermal Unit (BTU) - The amount of heat necessary to raise the temperature of one pound of water one degree Fahrenheit.

Horsepower - A unit that measures the rate at which energy is produced or used. A man doing heavy manual labor produces energy at a rate of about .08 horsepower.

Kilowatt - A unit that measures the rate at which energy is produced or used. Ten 100-watt lightbulbs use energy at the rate of one kilowatt (equal to 1000 watts) per hour.

Biomass - Plant materials in any form from algae to wood.

Breeder reactor - A nuclear reactor so designed that it produces more fuel than it uses.

DAY 3

Activities:

1. The teacher will lead discussion on home planning for conservation. She should lead students to be aware of the importance of a home facing north or south to avoid full sun. She should help them to see that in landscaping, the evergreens should be planted on the north for a wind break and the deciduous trees on the other exposures. They should be made aware of the importance of window arrangement, insulation, and the use of color on the exterior and interior. She should point out that dark colors absorb heat and light colors reflect heat.

2. The students should fill out the home checklist included in the unit.

3. The students, in a large group, will discuss the value of governmental controls and decide which controls they would be willing to have.

Materials needed - Home checklist for each student; pencils

A HOME CHECKLIST FOR ENERGY CONSERVATION

Heating

_____ Set heating thermostat at 68-70 degrees.

_____ Turn thermostat down at least 10 degrees at night.

_____ Eliminate use of home air conditioning. If air conditioning must be used, adjust settings so it does not come on below 78-80 degrees.

_____ Keep furnace filters clean for more efficient operation.

_____ Close fireplace damper when not in use.

_____ Open or close drapes to help control indoor temperatures.

_____ Do not use oven for heating the kitchen.

_____ Insulate homes. An uninsulated home requires twice the energy for space heating.

_____ Install weatherstripping around all windows and doors.

_____ Use storm windows, or cover windows with plastic, during colder months.

_____ Move obstructions away from cold air returns or hot air vents.

_____ Thermostats should not be placed on cold walls or outside walls.

_____ During summer, all windows that face the sun directly should be shaded.

_____ Keep baseboards and heating surfaces clean and unobstructed by furniture or draperies.

_____ Minimize the use of portable electric space heaters.

_____ Keep humidity as normal as possible (45 to 50 percent) by using exhaust fans in high-moisture areas.

_____ Minimum settings of 55 degrees should be maintained on thermostats when leaving for a period of time; i.e., vacations, moving from the residence, etc.

_____ Close foundation vents on the windy side of the house during cold weather.

_____ Shut off registers and heat vents in unused rooms (check to be sure there are no items in the room vulnerable to freezing).

_____ Cover the exterior of wall-mounted air conditioning units with plastic in winter to prevent air leakage.

Water

General

_____ Reduce water thermostats to 140 degrees.

_____ Turn electric water heaters off if you plan to be gone from home more than one day.

_____ Take showers when possible, instead of baths; make them brief, and turn faucet on to minimum practical water flow.

_____ Use less water for tub baths.

_____ Drain and flush your hot water tank at least once a year to prevent buildup of sediments.

_____ Repair dripping faucets and leaking toilet fixtures.

Dishwashing

_____ Wash only full loads in dishwasher.

_____ Use shortest cycle for load being washed.

_____ For hand dishwashing, use a tub of rinse water rather than running water.

Lights and Appliances

General

_____ Turn off all lights not in use.

_____ Reduce bulb wattage where practical.

_____ Eliminate yard lights. Turn on porch lights only when expecting visitors. Eliminate exterior Christmas lighting.

_____ Turn off all unused television, radio, stereo, etc.

_____ If you have a choice between color and black-and-white television, use the black-and-white set.

_____ Use sunlamps, hairdryers, electric haircurlers, etc., only when essential.

DAY 4

Activities:

1. The students report on ways they have involved the public in energy awareness.

2. The students listen to the TVA simulated "Energy Crisis." They discuss the implications.

3. They conduct Energy Awareness Day. They make lapel buttons to be worn during the day. They make posters to put up in the school. Each agrees to talk to at least one person concerning the situation.

Materials needed - Poster paper, scissors, glue, crayons

DAY 5

Activities:

1. The students should research material concerning the important energy fuel, oil. They should find out how long the nation can count on it as a fuel, where it is located, what a cartel is, and the significance of the OPEC organization.

2. Each student should write a paragraph entitled, "If 50 percent of the Energy Were Curtailed, What Would I Consider Important?"

Materials needed - Pencils and paper; research materials

DAY 6

Activities:

1. The students shall break into groups and study about natural gas, shale oil, and coal.

2. They will collect items that they consider overpackaged. They should discuss the cost to the consumer when this occurs. How much waste is involved?

Materials needed - Reference materials, overpackaged items

DAY 7

Activities:

1. The students, with the teacher as group leader, will learn about the possibilities of wind power, geothermal energy, and MHD (magnetohydrodynamics).

2. Each student will interview a person over 65 to discuss how fuel and energy needs have changed in the lifetime of that person.

DAY 8

Activities:

1. The students will read and learn about the possibilities of uranium as a source of energy. (See teacher material.)

2. They will read about and discuss the solar energy possibilities.

3. They will conduct the following experiments:

   a. What color absorbs the sun's heat best?

      Materials: white, black, green, red, and blue construction paper, all the same size; timer; uniformly-sized ice cubes.

      Place an ice cube on top of each sheet of construction paper. Which melts first? Would a house with a light or dark roof be cooler?

   b. Are materials warmer in the sun or in the shade?

      Materials: two thermometers, two styrofoam cups, watch.

      Pour equal amounts of cold water in two cups (the colder the better). Place a thermometer in each cup. Set one in the sun and the other in the shade. What is the temperature of each after 5, 10, 15 minutes?

   c. How much hotter does a house get when the windows face south instead of north?

      Materials: two cardboard boxes (same size), white paint or paper, two thermometers, plastic wrap, masking tape.

      Paint boxes; cover them both with white paper. Face one to the north and one to the south. Place a thermometer in each box and put them in the sun. Read the thermometer in 10, 20, 30 minutes.

4. Students take test "What Is Your EQ?"

Lint Zephyr

2. Lint Zephyr

50%

3. 50 percent

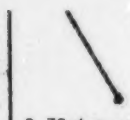
4. Pots & Pans 5. Insulation

more

6. More

Wasteful

7. Wasteful



8. 75 degrees

1/3

. One-third

Half

9. Half

. motors

. Caulk

LESS

5. Less

78 degrees or higher

5. 78 degrees or igher

effi-cient.

Efficient

efrigerator door

. Refrigerator or

what's your E.Q.?

How much do you know about energy? What's your Energy Quotient? To find out, read each statement. Find its correct answer. Then write the number of the answer in the box following the statement.

A. Slows the movement of heat. [5]

B. Recommended home temperature in winter. [11]

C. Open and close it quickly. [23]

D. A quick shower uses _____ the water of a normal bath. [29]

E. Put it around windows and doors. [27]

F. Maximum temperature for water heater. [18]

G. Insulated drapes can block out _____ of the heat from the sun. [3]

H. Look for it on an air conditioner. [12]

I. What every cooking pan needs on top. [15]

J. Heat Pump. [16]

K. Using the range oven for a heater or toaster is a _____ use of energy. [7]

L. Should be flat-bottomed. [4]

M. Air condition at _____. [25]

N. Clean it after each dryer load. [19]

O. Solid-state appliances use _____ energy than tube types. [26]

P. Vent it to the outside. [1]

Q. Heating and cooling system _____ should be cleaned or replaced every 30 days. [21]

R. Fluorescent lights are at least _____ times more efficent than incandescent lights. [9]

S. Clothes washers and dishwashers are most efficient when washing _____ loads. [22]

T. Small appliances are _____ users of energy. [24]

3½

9. 3½

66°

10. 66

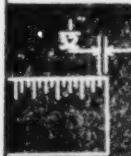
11. 68 degrees

EER

12. A high EER

Plas-tic

13. Plastic



14. 1/32 inch

A tight-fitting lid

15. A tight-fitting lid

200 per-cent heating efficiency

16. 200 percent heating efficiency

Use electricity wisely

Full

22. Full

filters

21. Filters

Wise

20. Wise

19. Lint filter

150 degrees

18. 150 degrees

170 degrees

17. 170 degrees

Annual/Monthly

Electricity is measured and you are billed by the kilowatthour (kWh). A kWh is equivalent to the electricity used by ten 100-watt light bulbs burning for one hour. To get the approximate operating cost for the appliances listed below, contact your power distributor for your cost per kWh. Then multiply the estimated monthly (or seasonal) kWh by the electric rate.

	Average kWh Used Annually	Estimated Monthly kWh
Electric furnace	13,200* (seasonal)	.....
Heat pump	6,600** (seasonal)	.....
Quick-recovery water heater	4,200	350
Clothes washer	1,900***	158
Refrigerator/freezer (14-cu. ft. frostless)	1,800	150
Freezer (15-cu. ft. frostless)	1,800	150
Dishwasher	1,560***	130
Air conditioning (Central, per ton)	1,500 (seasonal)	.....
Air conditioner (Room, one ton)	1,500 (seasonal)	.....
Freezer (15-cu. ft. manual defrost)	1,200	100
Refrigerator/freezer (14-cu. ft. manual defrost)	1,200	100
Range	1,200	100
Clothes dryer	1,000	83
Color television		
Tube type	660	55
Solid state	440	37
Dehumidifier	400	33
Black & white television		
Tube type	350	29
Solid state	120	10
Attic fan	300 (seasonal)	.....
Microwave oven	300	25
Roaster	200	17
Frying Pan	190	16
Electric blanket	150 (seasonal)	.....
Hand iron	150	13
Radio-phonograph	110	9
Coffeemaker	110	9
Trash compactor	50	4
Vacuum cleaner	50	4
Toaster	40	3
Food disposer	30	3
Sun lamp	20	2
Clock	18	2
Mixer	10	1
Toothbrush	0.5	0.04

*Based on 1,500-sq. ft. fully insulated house located in a 3,500-degree-day area.

**Heat only.

***Includes kWh for heating water used in these appliances.

For further information, see your local power distributor.

TVA TVA Power Utilization Division

Electricity

DAY 9

Activities:

1. Students listen to the teacher who tells them about bioconversion. (See teacher material.) Through structural analysis, discuss the word meaning.

2. Each student writes a haiku poem about energy or waste.

3. Each student makes a list of wasteful uses of energy he or she has observed.

4. They react to the Autosaur sheet which the teacher reads.

5. Each student collects energy "Believe-It-or-Nots."

Materials needed - Autosaur sheet (included in unit)

DAY 10

Activities:

1. Students will take an Energy Attitude Survey. (Included)

2. They will work on puzzles. (These are included in unit.)

Autosaur

Read to the class the following:

This is the year 3000. An Arizona newswriter has released a startling news story. He reports that during the 20th century earth was inhabited by huge metallic-looking beasts called "autosaurs." These monsters weighed 1,000 and 4,000 pounds and could travel at terrific rates of speed. Although they could be ridden, they were never domesticated by the natives. Apparently, thousands of natives lost their lives from them each year.

Around the last few decades of the century, he tells us the "autosaurs" mysteriously disappeared. Scientists believed they "starved" to death because of their depletion of food supply. A picture from a Los Angeles newspaper shows these creatures lined up before a feeding station. One of the natives is forced to feed the creatures by means of a hose. This effort evidently was unsuccessful.

Conclusion:

Although the extinction of any species is mourned, it does not appear that the ecological balance of that period was upset by the "autosaurs."

Discussion:

1. Does the name "autosaur" relate to any type of invention we use today? Why or why not?

2. Do you think this could very well be possible in the future?

3. If the planet was improved by the disappearing of the autosaur, how would you explain this advantage?

4. Make posters of different sizes of "autosaurs" that may have been found. Display around the room and have students explain how much "food supply" did it use and which do they think dies out first. Why?

Energy "Believe-It-or-Nots"

a. A flea has the muscle energy to leap more than 100 times its body length.

b. The roots of some trees have the power to split huge rocks.

c. A cheetah can run at a speed of 65 miles per hour.

These are unusual facts about energy. See how many more you can find using encyclopedias, Guinness Book of World Records, and other science materials.

Make an Energy "Believe-It-or-Nots" booklet and share it with your classmates. Illustrate each energy fact for your booklet to make it enjoyable and interesting.

Energy Attitudes Survey

1. Do you believe there is an energy shortage? ___yes ___no

2. Do you believe most Americans are energy "wasters"? ___yes ___no

3. Do you believe most Americans are energy "conservers"? ___yes ___no

4. Do you believe you have been given a realistic picture of the energy situation facing the United States? ___yes ___no

5. Do you believe it is the responsibility of every U. S. citizen to conserve energy voluntarily? ___yes ___no

6. Do you believe Americans are "spoiled," self-indulgent and reluctant to take responsibility for the future? ___yes ___no

7. Do you believe Americans will conserve energy only when government controls are imposed? ___yes ___no

8. Would you be willing to reduce your standard of living to conserve energy? ___yes ___no

9. Do you believe you as an individual can make an impact on energy consumption? ___yes ___no

10. Would you conserve energy to save money? ___yes ___no

11. Do you believe technology will "bail us out" of the energy shortage? ___yes ___no

12. Do you feel you have any input in the energy usage decisions made by your family? ___yes ___no

List five things that you can do to save energy.

Energy Puzzles

Unscramble letters to find the word that best answers each definition.

a.	very small units of matter	mtoa (atom)
b.	a chemical source of electricity	lelc (cell)
c.	electrons move along paths called	iucrscti (circuits)
d.	materials which will carry an electrical current	ncduocrtso (conductors)
e.	materials that won't conduct an electric current	listrnauos (insulators)
f.	a source of electricity from mechanical energy	ergaɹrtoe (generator)
g.	the dense, central part of an atom	eluncus (nucleus)
h.	the ability to work	yergne (energy)
i.	atomic particles having negative charges	selencrto (electrons)

Unscramble these sources of energy

a.	rsloa	(solar)
b.	mpeerotul	(petroleum)
c.	ltaid	(tidal)
d.	loeeatghmr	(geothermal)
e.	dniw	(wind)
f.	lnurata sga	(natural gas)
g.	olca	(coal)
h.	rwtae	(water)

EVALUATION:

Much of this unit is aimed at developing an attitude towards energy conservation. This is evaluated by examining whether or not a student chooses to demonstrate his or her new-found awareness. A teacher may evaluate the student's achievement of this unit's first objective by observing the student's performance on the following activities:

1. Student's participation in the "Energy Awareness Day."
2. The completed home energy checklist.
3. Student's participation in discussions.
4. The completed value judgments exercise.
5. Student's report on how he or she involved others in energy conservation.
6. The collection of overpackaged articles.
7. The interview with the older person.
8. Student's participation in the three solar energy experiments.
9. The completed "Energy IQ" exercise.
10. The collection of "Energy Believe-It-or-Nots."
11. The completed "Energy Attitude Survey."
12. The completed "Energy Puzzles."

The second objective involves students in writing a paragraph entitled "If 50 Percent of the Energy Were Curtailed, What Would I Consider Important?" and a haiku on energy or waste. Each student should turn in an example of each of these. The teacher should evaluate them based on pre-set criteria (e.g., correct punctuation, expression of personal feelings, correct paragraph elements, correct grammar, etc.)

Supplementary Activities

1. Interview the custodian of the school to see how energy helps him in his work.

2. Make a collage expressing "a good lifestyle when I am 30."

3. Make a list of as many wasteful uses of energy as you can. What can you do about them?

4. Interview someone over 65. Ask how energy use has changed in his or her lifetime.

5. Construct a collage using energy terms found in newspapers, magazines, and books.

6. Write a poem or haiku dealing with energy.

7. Collect examples of items you consider "overpackaged."

8. Construct a map of the world which shows the location of major energy sources.

9. Make a diorama showing the historical sequence of sources of energy from early man to the present.

10. Assume you are a congressman. Write a law which would reduce fuel and be equitable to all sectors of society.

11. Describe the relationship between the unequal distribution of limited energy resources and international trade.

12. Describe what you consider to be the most beautiful sight or object in your community. What sources of energy were used in its creation?

13. Discuss the effect of oil limitations by the Middle East countries on the United States. List the ways this would affect your personal life.

14. Conduct a spelling bee using energy words such as potential, kinetic, conservation, and kilowatt.

15. Select a committee to go to the local utility to find what industries are the largest energy users. In what ways do they benefit the community?

16. Make energy conservation displays or poster contests for the best energy-related entry.

Available Resources - Free and Inexpensive Materials

Publications

Citizen's Workshops on Energy and the Environment Handbook
DOE Technical Information Center
P. O. Box 62
Oak Ridge, TN 37830

Energy Conservation Activities for the Classroom, K-12
Kentucky Department of Education
Division of Program Development
Bureau of Instruction
Frankfort, KY 40601

Energy Conservation in the Home
Available from
DOE Technical Information Center
P. O. Box 62
Oak Ridge, TN 37830

Energy Is Our Key to Tomorrow
American Petroleum Institute
2101 L. Street, N. W.
Washington, DC 20037

"Energy Outlook 1978-1990"
Exxon Company
Public Affairs Department
Box 2180
Houston, TX 77001

Energy, Resources and Policy
Addison Wesley Publishing Company
Reading, MA 01867

Factsheets, National Science Teachers Association
DOE Technical Information Center
P. O. Box 62
Oak Ridge, TN 37830

"Mickey Mouse and Goofy Explore Energy"
Exxon Company
Public Affairs Department
Box 2180
Houston, TX 77001

"Mickey Mouse and Goofy Explore Energy Conservation"
Exxon Company
Public Affairs Department
Box 2180
Houston, TX 77001

The Energy Book
South Carolina Department of Education
Rutledge Office Building
Columbia, SC 29201

The Energy Crisis
Crown Publishers
419 Park Avenue, S.
New York, NY 10016

"The Energy Primer"
Tennessee Valley Authority
Chattanooga, TN 37401

The Environmental Impact of Electrical Power Generation: Nuclear and Fossil
Pennsylvania Department of Education
Box 911
Harrisburg, PA 17126

350 Ways to Save Energy (And Money) in Your Home and Car
Crown Publishers
419 Park Avenue, S.
New York, NY 10016

Other Materials

DOE Technical Information Center (Film Library)
P. O. Box 62
Oak Ridge, TN 37830

Exxon Company (Films)
Mr. Frank Hufford
Box 2180
Houston, TX 77001

TVA Simulated Energy Crisis, Broadcast (Cassette)
Mississippi Energy Extension Center
Dr. Jack Carroll
Box 5406
Mississippi State, MS 39762

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